

more than idle thrust when the reversing system malfunctions; except that it may produce any greater thrust that is shown to allow directional control to be maintained, with aerodynamic means alone, under the most critical reversing condition expected in operation.

(b) *For propeller reversing systems.* (1) Each system must be designed so that no single failure, likely combination of failures or malfunction of the system will result in unwanted reverse thrust under any operating condition. Failure of structural elements need not be considered if the probability of this type of failure is extremely remote.

(2) Compliance with paragraph (b)(1) of this section must be shown by failure analysis, or testing, or both, for propeller systems that allow the propeller blades to move from the flight low-pitch position to a position that is substantially less than the normal flight, low-pitch position. The analysis may include or be supported by the analysis made to show compliance with § 35.21 for the type certification of the propeller and associated installation components. Credit will be given for pertinent analysis and testing completed by the engine and propeller manufacturers.

[Doc. No. 26344, 58 FR 18971, Apr. 9, 1993, as amended by Amdt. 23-51, 61 FR 5136, Feb. 9, 1996]

#### **§ 23.934 Turbojet and turbofan engine thrust reverser systems tests.**

Thrust reverser systems of turbojet or turbofan engines must meet the requirements of § 33.97 of this chapter or it must be demonstrated by tests that engine operation and vibratory levels are not affected.

[Doc. No. 26344, 58 FR 18971, Apr. 9, 1993]

#### **§ 23.937 Turbopropeller-drag limiting systems.**

(a) Turbopropeller-powered airplane propeller-drag limiting systems must be designed so that no single failure or malfunction of any of the systems during normal or emergency operation results in propeller drag in excess of that for which the airplane was designed under the structural requirements of this part. Failure of structural elements of the drag limiting systems

need not be considered if the probability of this kind of failure is extremely remote.

(b) As used in this section, drag limiting systems include manual or automatic devices that, when actuated after engine power loss, can move the propeller blades toward the feather position to reduce windmilling drag to a safe level.

[Amdt. 23-7, 34 FR 13093, Aug. 13, 1969, as amended by Amdt. 23-43, 58 FR 18971, Apr. 9, 1993]

#### **§ 23.939 Powerplant operating characteristics.**

(a) Turbine engine powerplant operating characteristics must be investigated in flight to determine that no adverse characteristics (such as stall, surge, or flameout) are present, to a hazardous degree, during normal and emergency operation within the range of operating limitations of the airplane and of the engine.

(b) Turbocharged reciprocating engine operating characteristics must be investigated in flight to assure that no adverse characteristics, as a result of an inadvertent overboost, surge, flooding, or vapor lock, are present during normal or emergency operation of the engine(s) throughout the range of operating limitations of both airplane and engine.

(c) For turbine engines, the air inlet system must not, as a result of airflow distortion during normal operation, cause vibration harmful to the engine.

[Amdt. 23-7, 34 FR 13093 Aug. 13, 1969, as amended by Amdt. 23-14, 38 FR 31823, Nov. 19, 1973; Amdt. 23-18, 42 FR 15041, Mar. 17, 1977; Amdt. 23-42, 56 FR 354, Jan. 3, 1991]

#### **§ 23.943 Negative acceleration.**

No hazardous malfunction of an engine, an auxiliary power unit approved for use in flight, or any component or system associated with the powerplant or auxiliary power unit may occur when the airplane is operated at the negative accelerations within the flight envelopes prescribed in § 23.333. This must be shown for the greatest value and duration of the acceleration expected in service.

[Amdt. 23-18, 42 FR 15041, Mar. 17, 1977, as amended by Amdt. 23-43, 58 FR 18971, Apr. 9, 1993]